Foreign Broadcast Information Service

S&T CENTER

For Official Use Only

3 June 1987
Vol. 2, No. 7

Science and Technology Perspectives

DEVELOPMENTS

Technical Data Base

(Bulgaria) Sofia has established the IKAR data base "to facilitate information exchange" on technical processes and products developed at Bulgarian universities and institutes. Managed by the Ministry of National Education in collaboration with industrial and business groups, IKAR can be accessed through the Ikar Association, 55 a Chapaev Ul., Sofia 1574, Bulgaria. (Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT 18 Feb 87) Elli M. X2519

..... *Continued on Page 1*

FEATURE ARTICLES

REPORTS

PERSPECTIVES selections are based solely on foreign press, books and journals, or radio and television broadcasts. Some of the materials used in this publication will appear as abstracts or translations in FBIS serial reports. Comments and queries regarding this publication may be directed to the Managing Editor (Craig M. [redacted] or to individuals at the numbers listed with items.

STAT

Correction: On page 9 of Vol. 2, No. 4, the figure "1.5 cubic kilometers" should read "1.5 million cubic kilometers."

DEVELOPMENTS

DEVELOPMENTS highlights worldwide S&T events reported in the foreign media. Items followed by an asterisk will be published by FBIS. The contributor's name and telephone number are provided.

Artificial Intelligence

(EC) The European Commission has appointed a European scientific panel to prepare by May a comprehensive program called BRAIN (Basic Research in Adaptive Intelligence and Neurocomputing) to design a computer system that will duplicate certain human brain functions. Oriented to applications in robotics, the program would conduct R&D on computer systems that will enable industrial robots to process and respond to visual information. The initial program budget could amount to ECU20 million for 1987-88. (Brussels EC PRESS RELEASE IP (87) 68, 16 Feb 87)* Antwerp Unit/Sharon W. X2519

Aircraft

(FRG/PRC) The FRG's Messerschmitt Boelkow Blohm (MBB) and the PRC's China National Aero-Technology Import and Export Corporation (CATIC), which are jointly developing the MPC75 commuter aircraft, are negotiating with Japan's Mitsubishi Heavy Industries, Kawasaki Heavy Industries, Fuji Heavy Industries, and the Netherlands' Fokker in an effort to gain their participation in the aircraft's development and production. MBB and CATIC estimate initial sales of 1,200 aircraft (200 of these to be purchased by the PRC). Production is slated to begin in 1992 with certification by 1995-96. (Duesseldorf VDI NACHRICHTEN 9 Jan 87)* Elli M. X2519

(FRG/PRC/Netherlands/UK/France) In a joint effort to build a wind tunnel for testing the latest engine and supersonic airframe designs, the FRG, Netherlands, UK, and France are investing some DM500 million in the European Transsonic Wind Tunnel (ETW), scheduled to be operational in 1992. The ETW's so-called "cryogenic tunnel" will generate velocities between 450 and 2,000 kilometers/hour and will cause less heating on the model because of the cooled airflow. The technology to be used in the ETW updates that of the German-Dutch wind tunnel (built in 1980). (Hamburg DEUTSCHES ALLGEMEINES SONNTAGSBLATT No. 3, 18 Jan 87)* Elli M. X2519

Ariane

(France) "Repercussions" from Suriname's civil war and the reorganization of Guyana's military command have driven France to begin installing a battery of Crotale ground-to-air missiles and a Centaur radar for low-altitude detection at its Ariane launch site in Kourou (Guyana). The designated launch site for French military satellites as well as European civilian satellites, Kourou lies close to the Guyana-Suriname border and was described as subject to "possible air attacks." (Paris LE MONDE 7 March 87) Eva L. X2519

Computers

(Hungary) The Videoton Computer Engineering Factory's Development Institute has built a high-performance microcomputer that has CAD capability and accommodates several work stations. The institute is developing a graphics input tablet and a plotter as well as designing a basic software package for the machine. The computer is ranked by CEMA as state-of-the-art technology. (Budapest NEPSZAVA 27 Feb 87) Sari P. X2907

IR Emissions

(Italy) The Piaggio company is conducting secret studies to develop methods of shifting infrared emissions generated by aircraft engines into frequency bands different from those normally used by the IR heat-seeking missiles. This research involves shielding the hot parts of engines using heat-absorbent materials and mixing special additives with aircraft fuel to change the emitted IR frequencies. Italian press reports speculate that one of the first applications of this technology could be in the A.129 Mangusta combat helicopter project. (Parma AEREI in Italian No. 2, Feb 87; Rome AERONAUTICA E DIFESA No. 5, Mar 87) Milan Unit/Eva L. X2519

Microelectronics

(West Europe) Plessey (UK) has developed a signal processing chip with 200,000 gates and a specialized 16-bit microprocessor. The circuit uses three-level metallization technology developed jointly within an ESPRIT project by Plessey, GEC (UK), Thomson (France), and AEG (FRG) with Thomson working on dielectric oxides, GEC on nitrides, and AEG and Plessey on polyimides. (Paris LA JAUNE ET LA ROUGE Oct 86)* Antwerp Unit/Eva L. X2519

Microgravity Metal Processing

(France) The French Nuclear Studies Center in Grenoble is preparing experiments on the solidification of refractory alloys that will be conducted during future space missions. The first tests will involve niobium-, molybdenum-, or tungsten-based alloys. Preparation before launch will be done in an ultravacuum tube (10^{-8} torr) measuring 47 meters in height which will be operational within one year at a cost of FR8 million. (Paris L'USINE NOUVELLE 12 Feb 87) Antwerp Unit/Sharon W. X2519

Mine Detector Robot

(FRG) Dornier and Elto have built a prototype remote-controlled robot which detects antitank and antipersonnel mines at depths of up to 40 centimeters. Made of a fiber glass reinforced composite material (not further described) and having a third of the weight needed to trip mines, the robot uses a detection system that emits microwaves. The robot is equipped with a lifting fork (made of an unspecified composite material) which trips antipersonnel mines. A fluorescent foam leaves a trace of the robot's path on the ground and marks detected mines. (Paris ROBOTS 25 Jan 87) Eva L. X2519

Optoelectronics

(France) Leti (Laboratory for Electronics and Information Technology) has developed a 5 millimeter by 10 millimeter microelectronic component which combines, on one silicon substrate, a light sensing optical circuit and a signal processing circuit. The device, which detects optical information through a fiber and then provides an electronic signal representing the polarization state of the light signal, will be marketed by a new firm called CSO (Optical Sensor Company) as a microinterferometer (a device which functionally combines a microscope and an interferometer for use in studying thin films and transparent coatings). (Paris ELECTRONIQUE ACTUALITES 6 Feb 87) Eva L. X2519

USSR: CHEMICAL RESEARCH TO THE YEAR 2000

Key Points: In an article in ZHURNAL PRIKLADNOY KHIMII (Sep 86), P. G. Romankov and M. I. Kurochkina of the Leningrad Technical Institute imeni Lensovet analyzed plans announced at the 27th CPSU Congress that will guide Soviet chemical research through the year 2000. Primary goals in this field include increased chemical machine building, new materials development, energy conservation, environmental protection, automation in the chemical industry, and improved basic research.

Overview

Soviet economists project that combined chemical and petrochemical production volume will have to increase about 30 percent by the end of the century to keep pace with national demand. To ensure this rise in output, labor productivity will have to increase an average 30 percent while production costs must decrease 7 to 9 percent. Although radical changes in the direction of Soviet chemical research were adopted over a decade ago, basic research in theoretical chemistry and chemical engineering (vital to related technologies such as microelectronics) must be accelerated for the USSR to remain a technological world leader, according to the authors.

Areas of the chemical industry targeted by the 27th CPSU Congress include: 1) mining of chemicals, 2) paint and varnish, 3) basic chemicals, 4) synthetic fibers, 5) plastic and fiberglass, 6) synthetic dyes, 7) synthetic resins, 8) household chemical goods, 9) chemical agents for plant protection, 10) chemical reagents, ultrapure substances, and catalysts, 11) photographic materials, and 12) pharmaceuticals. Major importance was also given to the nitrogen, phosphorus, and potassium fertilizer industry because of its impact on the USSR Food Program.

New Technical Processes

The authors regard close cooperation between chemical research and industrial application as the key to developing new high-speed, continuous processes that boost production while safeguarding the environment. Current successes resulting from this collaboration have occurred in the following fields:

— Catalytic Chemistry: New metallic catalysts such as rhodium have enabled operating temperatures and pressures to be lowered considerably in acetic acid and methanol production. Ion-exchange resins act as membrane catalysts which accelerate production and separate the final products. Heterogeneous catalysis is now being carried out in a fluidized layer, allowing it to proceed more intensively than in stationary layers.

— Pulsating Fields: Applying electrical, magnetic, or acoustical fields to chemical processes is a promising intensification method. The Moscow Institute of Chemical Machine Building (MIKhM) has developed a vibroboiling layer which is controlled electromagnetically and acoustically.

— Photochemistry: Photochemical chlorination of benzene is used in insecticide production, UV radiation is used for cyclization in vitamin production, and photochemical equipment is employed throughout the chemical industry.

— Laser Chemistry: Lasers are used widely in analytical chemistry.

— Plasma Chemistry: High temperature plasma reactions are used in natural gas refining, refractory building materials production, and pigment production for paints. Low-temperature plasma may find application in ammonia production.

— Radiation Chemistry: These processes can be conducted at any temperature or pressure without catalysts. It is possible that atomic power plants will become large-scale chemical enterprises of radiochemical synthesis.

New Materials

A number of new materials have recently been developed in the USSR such as new heat-resistant materials produced with plasma technology or obtained from waste products. The BeSSR Academy of Sciences' Metal Polymer Systems of Mechanics Institute has produced slide bearings by impregnating wood with NO_2 and copper formate. Advances have been made in producing amorphous metals with higher corrosion resistance than crystalline metals. "Borazon," a boron nitride derivative, is one of the new superhard materials. Ultrapure materials for semiconductors and fiber optics are being improved, and synthetic rubies, sapphires, amethysts, fianites, and silicates are being further refined.

Heat-resistant and super-strong polymers are replacing metal in a growing number of Soviet industries. In addition, Soviet-developed rigid chain polymers (polyamide), composites, and filled plastics exhibit unique properties such as superstrength and thermostability that enable them to be used for highly specialized tasks. The new "organic metals," polymers with internal conductivity close to that of chromium, have major potential applications (see PERSPECTIVES Vol. 2, No. 3 pp 6-7).

Energy-Saving Technologies

The Soviets are looking to hydrogen as an abundant fuel of the future and are investigating its economical production by means of biological and nuclear methods, the photoelectric, photochemical, and solar decomposition of water, and electrolysis.

The processing of Kansko-Achinsk coal may evolve into an energy-saving integrated technology that will allow the production of boiler and motor fuel, high-calorie solid fuels, and products for organic synthesis.

Improving heat exchangers and making sea water distillation economically feasible are other goals in this area.

Factory Automation

The Soviet chemical industry is trying to reduce its dependence on large-tonnage "superunits" (whose size has increased five to tenfold in recent years) which take longer than the usual two to three years to bring fully on line and which are difficult to service. The Soviets plan to use smaller, more flexible manufacturing systems that will be run by minicomputers. To date, success has been reported in the use of microelectronics in automated drying processes.

Basic Research

The 27th CPSU Congress has given priority to basic research and allocated increased funding with the condition that research be conducted efficiently. However, accelerating the transfer of new technologies from the laboratory to the factory and improving chemical quality and quantity will require a considerably more sophisticated chemical industry infrastructure, according to the authors.

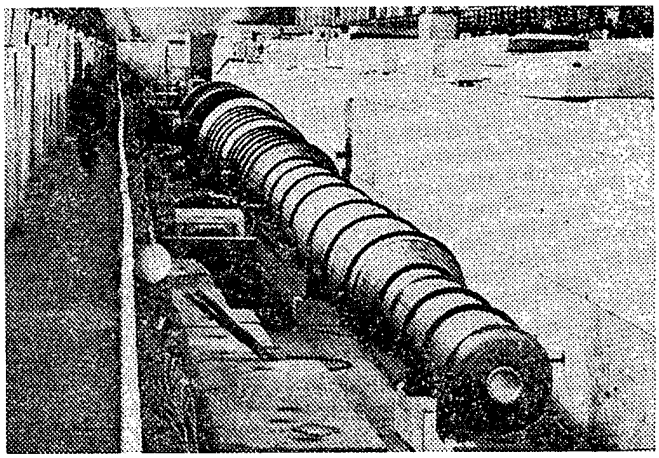
Kris P. X2898

USSR: ACCELERATOR UNDER CONSTRUCTION

Key Points: In January the Soviet Union announced that it would assume world leadership in high energy physics with the activation of its new proton accelerator in 1993. Designated the Serpukhov accelerator, the machine will have a 13-mile main accelerator ring and a 20-mile tunnel network (including branch corridors). As of February nearly two miles of tunnel had been excavated, according to NTR: PROBLEMY I RESHENIYA, Vol. 2, No. 41 (20 Jan-2 Feb 87) and ZNANIYE-SILA, No.2 (Feb 87).

The Serpukhov accelerator, termed a "synchrophasotron" by the Soviets, reportedly will be 40 times more powerful than the USSR's current facility (which is located on the same site and will be incorporated into the new complex). The accelerator will go into operation two to three years before the planned US Superconducting Super Collider (SSC). The project is being directed by the Institute of High Energy Physics near the town of Protvino (south of Moscow).

Institute scientists expect that data from Serpukhov accelerator experiments will refine theories directly applicable to the development of enhanced nuclear energy resources for the Soviet Union, structural studies of industrial materials, and production of isotopes for medical use. The accelerator will be the first machine capable of generating neutrino beams at an energy level high enough—6 TeV (trillion electron volts)—to interact sufficiently with the Earth's geologic strata and, thus, enable scientists to scan the deepest regions of the planet's interior. According to institute director Prof. Leonid D. Solovyev in a January TASS interview, this capability may make possible the identification of vast new mineral deposits.



A component of the neutrino generator to be used in experimental scanning of the Earth's geologic structure.

Soviet physicists have studied the principles and design of the Fermi National Accelerator Laboratory's Tevatron, a superconducting-magnet-based synchrotron. They are using the Tevatron as a model for the much larger Serpukhov accelerator, which will generate 3.3 times more energy than the Tevatron (1.8 TeV). (In terms of staff, the Soviet complex will employ 5,500, whereas the Tevatron facility employs 2,000.) The use of superconducting magnets will allow the Soviets to sharply reduce the enormous cost of building and operating the accelerator. Chief project scientists K. Myznikov, A. Ageyev, and V. Svitnik are directing R&D activity geared to the production of 2,500 superconducting

magnets for the first ring of the accelerator and an additional 2,500 superconducting magnets for the second ring. Soviet scientists estimate that the use of these magnets, instead of conventional magnets as in the present Soviet accelerator, will reduce overall magnet weight from 1 million tons to 20,000 tons. The accelerator design calls for the use of niobium-titanium alloy wires that require cryogenic cooling by expensive liquid helium to achieve superconductivity. The incorporation of new special alloys permitting the use of liquid nitrogen as a cooling agent would further reduce the cost of using superconducting magnets. Nonetheless, according to Soviet scientists, the use of liquid helium would result in the generation of 40 times the energy at only three times the electrical power consumption of the current accelerator.

The diameter of the chamber containing counterrotating particle beams will be 8 centimeters. Collisions will occur when the counterrotating beams are constricted to a passage about 10 microns in diameter. A detector similar to that in the Tevatron will be used to record the collisions. The charge, momentum, and direction of subatomic particle movement resulting from the impact will be analyzed by an extensive computer network.

John H. X2723

USSR: PRE-CHERNOBYL CROP RADIATION

Key Points: Concerned over rising soil and crop radiation levels, Soviet scientists have produced numerous articles on radionuclide content and migration in soil and agricultural crops. Although this research, presented in the journals AGROKHIMIYA (Oct and Dec 86) and POCHVOVEDENIYE (Oct 86), was conducted up to a year before the Chernobyl accident, it provides baseline information about strontium 90 and cesium 137 (both fission products) as well as thorium and plutonium isotope activity in the RSFSR, the Ukraine, Belorussia, and under laboratory conditions.

Radionuclide contamination of soil and crops is of major concern to Soviet environmental chemists, especially considering the widespread use of agrochemicals and the proliferation of nuclear power plants. Soviet-made fertilizers have been found to be primary sources of thorium isotope contamination in the RSFSR. Chemists have kept meticulous records of nuclear fission product migration through soil and into crops in the Ukraine and Belorussia, enabling them to predict future migrational behavior. Soviet chemists have even deliberately contaminated an experimental field with plutonium to better understand how this element might behave in the event of a nuclear accident.

Chemists at the NII of Radiation Hygiene, Leningrad have determined that widespread use of chemical fertilizers is increasingly contaminating soil and staple crops with radioactive thorium isotopes. Concern about the entrance of radionuclides into the food chain led them to measure thorium isotope content in crops and submit their results in May 1985. Soviet-made phosphorus fertilizers contain an average 759 picocuries (pCi)/kg of ^{228}Th, which is much greater than natural radionuclide concentration in soil. Plants more readily absorb fertilizer Th because it is not chelated with organic substances as is naturally occurring Th. For RSFSR soils, the maximum ^{228}Th concentration was found to be 1050 pCi/mg while the minimum was 410 pCi/mg. Oats had the highest accumulation coefficients for Th isotopes while barley and rye had the lowest.* Other crops tested were wheat, rice, and soy. Accumulation of ^{228}Th in primary produce was found to be much greater than that of ^{232}Th. The authors explained that ^{228}Th is much more mobile in soil.

Scientists at the Kirovogradskaya Zonal Agrochemical Laboratory measured radioactive fission product content in soil and in several important crops to determine how readily strontium and cesium isotopes migrate from the soil surface to deeper levels and from soil into the edible parts of plants. During the period 1978-83, they found the concentrations to be 3.0-5.2 Becquerels (Bq)/kg of ^{90}Sr and 4.1-8.9 Bq/kg of ^{137}Cs** in Kirovogradskaya Oblast topsoil (just northeast of Odessa in the Ukraine). In deeper levels of soil, the concentrations decreased to 2.2-4.5 and 3.5-6.5 Bq/kg respectively. Measurements of ^{90}Sr and ^{137}Cs in alfalfa hay, oats, barley, winter wheat, sugar beets, sunflowers, corn, and cabbage showed alfalfa hay containing 2.48-3.40 Bq/kg of ^{90}Sr and 1.84-2.29 Bq/kg of ^{137}Cs (the maximum recorded) and cabbage containing 0.22-0.29 Bq/kg of ^{90}Sr and 0.14-0.22 Bq/kg of ^{137}Cs (the minimum recorded). Radionuclide concentration was found to be three to seven times higher in secondary grain crop produce than in the actual grains.

Chemists at the Institute of Geochemistry and Analytical Chemistry im. V. I. Vernadskiy and the Belorusskiy NII of Soil Science and Agricultural Chemistry have developed a mathematical model which enables them to predict how quickly radioactive fission products will migrate through soil. Based

---

* Accumulation coefficient = Radionuclide concentration in plants/Radionuclide concentration in soil

** 1 curie (Ci) = 3.7 x 1010 Becquerels (Bq)

on ^{90}Sr and ^{137}Cs measurements taken from Belorussian soils during the period 1966-81, they produced a general equation which accurately predicts the vertical migration of ^{90}Sr and ^{137}Cs through various types of soil. ^{90}Sr migrates at a rate of $2.5 \times 10^{-7} cm^2/s$, and ^{137}Cs at approximately $1.6 \times 10^{-7} cm^2/s$. Results calculated from the equation agree so closely with experimental results that the chemists hope to apply their equation universally.

Interested in how plutonium would migrate through soil and into crops in a controlled environment, Ye. A. Fedorov and others at an unspecified institute contaminated a plot with Pu and measured Pu content in the soil and crops over several years, submitting their results in July 1985. They contaminated a $290 m^2$ plot with 3.7×10^{10} Bq of Pu, planted crop seedlings in and around the contaminated plot, and measured the spread of radionuclides through the soil (up to a $1.2 \times 10^4 m^2$ boundary) and into the plants. More than half the introduced Pu migrated from the contaminated plot to the periphery of the bounded area. Next to agricultural working of the soil, wind accounted for the greatest horizontal movement of Pu. Secondary cucumber produce had the highest Pu accumulation coefficient (250×10^{-4}), while primary wheat produce (the grains) had the lowest (0.1×10^{-4}). The scientists explained that the grains' hulls protected them from airborne contamination. Primary and secondary produce of barley, onions, potatoes, tomatoes, radishes, and lettuce were also tested. These experimental results can be used for "modeling the accumulation of Pu in ecosystems subjected to exhausts from nuclear fuel cycle industries," according to the authors.

Kris P. X2898

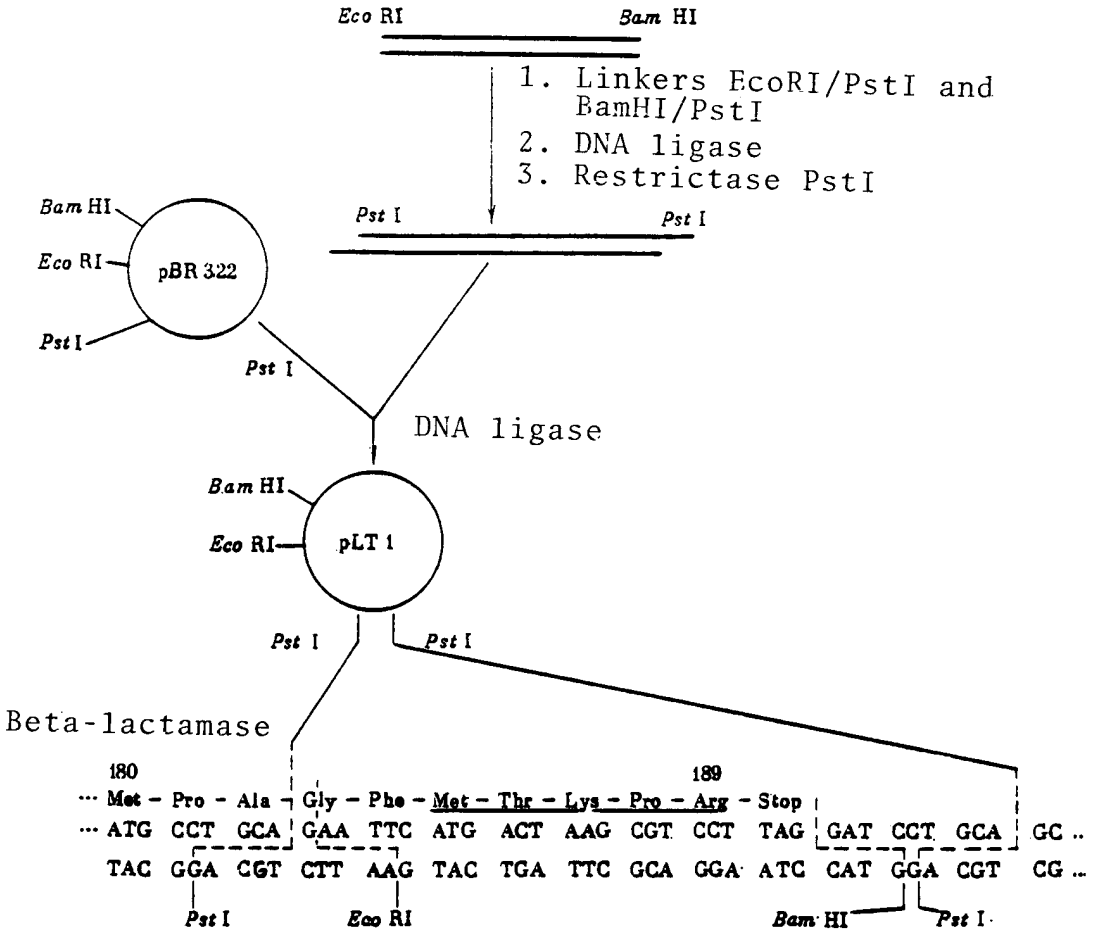
USSR: GENETICALLY ENGINEERED ANTISTRESS PEPTIDE

Key Points: A research team under S.N. Zagrebelnyy at the Scientific Research Design and Technology Institute of Biologically Active Substances in Berdsk has produced genetically engineered tuftsin, according to the Soviet journal BIOORGANICHESKAYA KHIMIYA (Oct 86). Tuftsin is a tetrapeptide (Thr-Lys-Pro-Arg) that has been shown to have potential application in stress reduction. The substance also stimulates phagocytosis and increases motor activity and learning capability in rats.

The basic approach to producing a substance by genetic engineering is to introduce foreign DNA into a host cell using a "vector" or "cloning vehicle." Because foreign DNA may not integrate into a host chromosome, a vector is a means of carrying the foreign DNA into the host cell and ensuring its replication. Plasmids, which are circular pieces of DNA often found in bacterial cells, are frequently used as vectors.

The Zagrebelnyy team reportedly has constructed a recombinant plasmid (the pLT1 plasmid) which codes for a hybrid beta-lactamase having the tuftsin tetrapeptide at its carboxy terminus. This was accomplished by inserting a synthetic tuftsin-coding DNA fragment into the pBR322 vector. The pBR322 vector is an artificial plasmid which replicates independently from chromosomal DNA in the bacterium *Escherichia coli* (*E. coli*) and contains genes for ampicillin and tetracycline resistance. The gene product responsible for ampicillin resistance is the enzyme beta-lactamase.

When *E. coli* cells are transformed with this recombinant plasmid, the hybrid beta-lactamase is produced and secreted into the periplasmic space (the space between the plasma membrane and the cell wall). This secretion not only simplifies the isolation and purification of the enzyme but makes it less subject to breakdown by protein-degrading enzymes in the cell. The Soviet team reportedly demonstrated that up to 30 percent of the newly synthesized hybrid beta-lactamase is secreted into the periplasmic space. Tuftsin is cleaved from the hybrid protein with cyanogen bromide and isolated by chromatography.



The procedure for obtaining the recombinant plasmid pLT1 is shown in the above diagram. A synthetic gene for tuftsin flanked by restriction sites *Eco*RI and *Bam*HI is incubated with the linkers *Eco*RI/*Pst*I and *Bam*HI/*Pst*I in the presence of DNA ligase. *Eco*RI, *Bam*HI, and *Pst*I designate sites for bacterial restriction endonucleases from *E. coli*, *Bacillus amyloliquefaciens*, and *Providencia stuartii* respectively. These enzymes recognize specific DNA sequences and have unique cleavage sites. For example, the *Pst*I restrictase recognition sequence is

5'-CTGC*AG*

3'-*GA*CGTC

where the italicized groups represent the cleavage sites. DNA ligase is an enzyme which catalyzes the joining of DNA fragments. After treatment with restrictase *Pst*I, a DNA fragment is obtained which can be incorporated into the pBR322 plasmid following its treatment with restrictase *Pst*I. The bottom of the diagram shows the nucleotide sequence of the inserted synthetic fragment and the corresponding amino acid sequence for which it codes.

Marilyn B. X2725

REPORTS

REPORTS surveys science and technology trends as detailed in articles, books, and journals. It also includes summaries and listings of articles and books which may serve as potential sources for future research. Conference proceedings will occasionally be presented in this section.

USSR/FINLAND: SOVIET TRADE FAIR

The Soviets will exhibit a "cross-section" of their latest technology during a trade fair in Helsinki from 15-28 May, according to HELSINGIN SANOMAT (17 Apr). Machine tool exhibits will be presented and patents made available in areas such as metallurgy, chemical processes, X-ray techniques, and transportation technology. In addition, the Soviet space organization Glavkosmos, which has begun marketing commercial satellite launches, will attend.

For more information, contact Elli M. X2519.

JAPAN/SOUTH KOREA: STEEL TECHNOLOGY

The Science and Technology Agency's National Research Institute for Metals (NRIM) has concluded a five-year joint research agreement with the Korea Advanced Institute for Science and Technology (KAIST) to develop a continuous casting steel process that uses a top-blowing converter, according to NIKKAN KOGYO SHIMBUN. (For related reporting on this technology, see PERSPECTIVES Vol. 1, No. 10 pp 7-8). NRIM has already established the basic technology for the new process. The South Koreans began their own R&D effort last September with a budget equivalent to 12 million yen for the first year.

NRIM hopes to replace the separate refining processes for desiliconization, dephosphorization, desulfurization, and decarburization now used in oxygen top-blowing converters with one continuous casting process. Japanese researchers have focused on the multi-tub refining method which they hope will enable steel producers to introduce continuous furnace-to-finished goods production systems.

KAIST plans to use the Japanese advances to build a prototype plant with a 2-to-3-ton capacity in which the institute will conduct research on the removal of silicon, sulfur, phosphorous, and carbon impurities from steel. NRIM, however, will rely on computer simulations to develop the most effective casting process and will conduct speed theory analyses of high-temperature interface reactions using a baby Bessemer converter.

Junko A. X2726

HUNGARY: "INNOVATION PARKS"

The Hungarian Ministries of Industry and Culture, the National Technical Development Committee (OMFB), and the Academy of Sciences have launched a joint effort to establish so-called "innovation parks"—multidisciplinary facilities that the government will use as a means of rapidly transferring research results to industrial production, according to February reports in FIGYELO and NEPSZABADSAG. A Ministry of Industry official commented that the parks will be focal points for scientific research, technical training, and manufacturing and will operate as profit-making ventures modeled on the "Silicon Valley" concept.

The first facility was established at Debrecen last October by the Lajos Kossuth University, the Academy of Sciences' Nuclear Research Institute, the Roller Bearing Works, Medicor, the Biogal Pharmaceutical Factory, the Tungsram Works (United Incandescent), the Technova Industrial Development Bank, and several regional industrial enterprises. The park will conduct R&D in applied physics, nuclear engineering, electronics, biotechnology, scientific instrumentation, and environmental protection.

The Hungarians are studying the establishment of several similar facilities. In addition to the Debrecen facility, the government is planning an innovation center at Paks (the site of Hungary's nuclear power plant) that will conduct nuclear energy-related R&D and will support a "special college" to be established at the center. The Academy of Sciences, the OMFB, and the Ministry of Industry plan to establish a biotechnology center at Szeged whose finances and investment portfolio will be managed by the Biotechnika Stock Company. Center R&D will be conducted at a major new industrial laboratory whose structure and staffing will be administered by the Academy of Sciences' Szeged Biological Center and the Attila Jozsef University. Moreover, the Ministry of Industry, the OMFB, and the Budapest Technical University have concluded a framework agreement for a center to be established at the university for R&D efforts in microelectronics, factory automation (particularly in the machine industry), high-precision machining, and specialized electronics instruments. A feasibility study on the center is being conducted by the Technova Industrial Development Bank.

Sari P. X2907

ISRAEL: LASER MARKETING

Small Israeli companies (less than 300 employees) are developing laser products for sale almost exclusively abroad. These sales reportedly are challenging US and Japanese market supremacy in this field, according to the Paris CPE BULLETIN (Jul-Aug 86). The following is a survey of some of the more prominent Israeli companies.

Laser Industries, Ltd.—Established in 1973, Laser Industries specializes in medical lasers. The company has 300 employees with an annual growth rate of 40 percent. In 1976, Laser Industries was authorized by the FDA to market its CO_2 lasers in the US.

Metalworking Lasers International, Ltd. (MLI)—This firm initially was a subsidiary of Schaeffer (US), Sciacky Bros. (US), and Laser Industries (Israel); however, the US partners withdrew in 1985. MLI produces a 4-, 5-, and 8-kilowatt CO_2 laser. (The 8-kilowatt model costs $500,000 per unit.) In 1986, MLI signed the first AFRIST (a Franco-Israeli association created in 1984 to promote scientific and technological research between the two countries) contract with Sciacky of France for the use of MLI lasers in factory automation equipment.

Optrotech, Ltd.—Optrotech (265 employees) was set up in 1981 by Elop Electro Optics Industries, Ltd. as a pioneer firm in the field of printed circuit inspection lasers. In 1983, Optrotech introduced its first machine for detecting defects in printed circuits. By 1985 company sales had reached 70 units per year with an annual revenue of $20 million.

Elop Industries, Ltd.—Elop (120 Employees) is national leader in the production of lasers for foreign military purchasers, who account for over half of all Israeli laser sales. The firm specializes in passive night vision systems, infrared- or laser-based intrusion detecting systems, and military laser telecommunications that use Nd:YAG, Nd, and GaAs lasers.

IT Lasers—Specializing in surveillance lasers, IT manufactures two types of light, compact night vision instruments that can be fitted to the barrels of most standard weapons: a laser that emits an intense light (on the order of 6 million candellas) in the visible spectrum that blinds the target and a semiconductor diode (GaAlAs) laser used in conjunction with night vision instruments. IT Lasers has also developed technology to image through "opaque curtains" (such as smoke, fog, or snow).

Antwerp Unit/Andrea S. X2830

PREVIEWS

PREVIEWS is an annotated list of selected science and technology items being translated by FBIS. The list may also contain previously published items of wide consumer interest.

EUROPE/LATIN AMERICA REPORT: SCIENCE AND TECHNOLOGY

ECRC DIRECTOR ON LATEST COMPUTER PROJECTS

The ECRC (European Computer Industry Research Center), a cooperative venture among Bull of France, Siemens of the FRG, and ICL of the UK, now employs 42 researchers and has a budget of DM40 million through 1988. Interview with director Herve Gallaire describes the ECRC's latest projects, notably in parallel computer architecture. (Paris LE MONDE INFORMATIQUE 19 Jan 87)

JAPANESE FIRM PRODUCES ASEA "SCARA" ROBOT

Article examines Nitto-Seiko manufacturing in Japan of IRB 300—the fastest SCARA (Selective Compliance Assembly Robot Arm) manipulator in the world—in accordance with ASEA Robotics design specifications. (Sundbyberg MODERN ELEKTRONIK 9 Feb 87)

EUROPEAN R&D IN SPEECH RECOGNITION TECHNOLOGY

Series of articles details projects at France's University of Nancy and within the ESPRIT program to develop computers able to recognize speech. France's defense research agency DRET, Thomson (France), AEG (FRG), and CSELT and Olivetti (Italy) are also involved. (Turin MEDIA DUEMILA No 2, Feb 87) [Published in ELS-87-017, 1 Apr 87, pp 26-52]

FRG REFINES X-RAY LITHOGRAPHY FOR 16-MBIT CHIP

Article describes FRG advances in X-ray lithography and the FRG's plans to use the COSY (Compact Storage Ring for Synchrotron Radiation) to develop and market a 16-megabit DRAM by 1991. (Stuttgart BILD DER WISSENSCHAFT Oct 86)

EUROPEANS AFFILIATE WITH US FIRM FOR FLAT PANEL TECHNOLOGY

Article examines Thomson CSF (France) and VDO (FRG) plans to develop and manufacture color liquid crystal display devices in cooperation with General Electric. Applications are expected in civil and military aircraft as well as in automobiles. (Paris AIR & COSMOS 7 Mar 87)

BULL DPS 7000 OFFICE AUTOMATION COMPUTERS TO COMPETE WITH IBM

A single CMOS chip with 20,000 logic functions and 60,000 transistors forms the basis for Bull's new DPS 7000 computers. Articles detail the compatabilities of the five DPS models and their role in Bull's strategy to compete with IBM. (Paris LE MONDE INFORMATIQUE 6 Apr 87; Paris ZERO UN INFORMATIQUE 6 Apr 87)

ULTRATHIN FILM R&D AT NEW MAX PLANCK POLYMER INSTITUTE

Ultrathin plastic films with applications in optical computers and biosensors are the object of a DM37 million R&D project at the FRG's newly created Max Planck Polymer Research Institute. Article examines institute's current projects, cooperation with industry, and personnel and equipment. (Stuttgart BILD DER WISSENSCHAFT Mar 87)